

brief descriptions of the added drawings. Withdrawal of the objection to the drawings is therefore respectfully requested.

Claims 1-16 are rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicants respectfully traverse this rejection.

All usual games in the planet the Earth, which include using of game elements, which are movable in the space, have, at least, one game event assessment mean, located in the same space and registration of a game event occurrence is being effected by the means of a technical mean according to dislocation of the game element about the game event assessment means.

Some examples are automobile races or horserace. Indeed, the game elements in these games are, for example, automobiles or horses, the game event assessment mean is the finish line and the technical mean is, for example, the device of photofinish or a technical facility of displaying the game event using television. Thus, such kind of games includes made by the spectators bets on the game event registration, performed by game elements which are capable of moving in space, registering a game event occurrence using a facility by a spatial position of the game elements relative to at least one game event assessment means located in the same space, and allotting a payoff.

Other kinds of games, using, for example, accidental hits of the game fields by the game balls, have the game elements capable

of moving in space - balls, game event assessment means - surface divided into game fields, the facility - a device for detecting and displaying a game field hit by a game element. Thus, these kind of games also include bets made by the spectators on the game event registration, performed by game elements which are capable of moving in space, registering a game event occurrence using a facility by a spatial position of the game elements relative to at least one game event assessment means located in the same space, and allotting a payoff.

In the disclosed method of conducting the game according to applicants' invention, the game elements are the objects capable of moving in cosmic space. And as the Earth is also situated in a cosmic space, in the claims of the invention the part of the space for moving of the game elements is picked out outside the Earth.

Regarding the terminology "facility of a spatial position", applicants respectfully believe this is clear and definite. However, if the Examiner wishes, applicants would consider changing this language to move the words "using a facility" after the word "registering", thus, it would read "registering using a facility by a spatial position of the game elements relative to at least one game event assessment means located in the same space"..

To have the game elements outside the Earth, one has to launch the space vehicles or to use movable elements already situated in space, such as meteoroid particles or a cosmic waste. As the indicated game elements are situated and move outside the

Earth, the game assessment means are situated in the same space to make it possible to realize the game; and to learn about the game event assessment outside the Earth it is necessary to have a facility providing displaying the game results on the Earth. Such a facility, for example, at realizing the space vehicles races, is the system of tracking space objects presently used in the Flight Control Centers and also special (for example, optical and radiolocation) ones, see for example, the document "Organization of United Nations. Committee of using the cosmic space in the peaceful purposes. Science-technical subcommittee of space waste. A/AC. 105/707 pages 7, 9.

The interest of the game is the same as at realizing auto races or realizing bingo for mass auditoriums, when one makes a bet on one or another game element. At this, the interest increases because the citizens of different countries can take part in the space vehicles races. Also increases the cognition of the game, because the participants will try to learn technical characteristics of the space vehicles, study the ballistic processes and also increase their general education level in the problems of high technologies, space investigations, space problems, in particular, the problem of "space waste. Financial profit is attraction of additional means, gained during the game, to astronautics development, creation of new space vehicles, creation of new joint orbital stations, realizing of projects on planets investigations, solution of the scientific, technical and social problems. Another profit is the possibility to clear cosmic space of space waste by its capturing during the races or

during the targets bombardment, acquiring of new scientific data concerning the problem of space waste. Besides that, there are no rescue groups for saving crews in extreme situations in the cosmic space outside the Earth, unlike the ordinary races on the Earth. At launching new space vehicle from the surface of the Earth for a crew rescue much time can be lost and it will be impossible to rescue the crew. If there are, at least, two spacecrafts moving to one and the same point, the crew of one of the spacecrafts can help another one in the shortest time. The flights safety increases.

Concerning the Examiner's comment about claim 16, "Objects capable of randomly moving in space are chosen as the game elements" that is why the person does not have to have skill and special knowledge to use them in the game. The process of realizing the game is described in details in pages 13-20 of the Description. Natural phenomenon, such as gravitation, are not used in the game.

All the facilities for realizing the game are described in details in the Specification, that is why any person skilled in astronautics can realize the invention using those facilities which are rather detailed described in the materials of the application and known from the art.

In item 6 of the Office Action, claims 1-16 are rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse this rejection.

Concerning claims 1, 3 and 5-6, the game event assessment means is the object located outside the Earth. It is a planet, the earlier launched space vehicle, the space waste. Its function is to assess the game event realization - a space vehicle's landing on the planet, going near it, determining the distance gone to it. As a game event assessment means can also be used a technogenic object, related to space waste, and at reaching it, the space waste capturing is realized by the space vehicle. Thus, the cosmic space is being cleaned of waste. The fact the game event occurrence, beforehand discussed between the game organizations and participants, is being assessed. It can be, for example, getting on one or another planet, passing near the earlier launched space vehicle, total amount of captured space waste particles and so on. The process is realized by the system of space objects tracking. When bets are accepted from the game participants, the space vehicles may be located on the Earth and prepared to be launched, or already placed in orbit. Every space vehicle may have an orbit of its own, like tracks for sprinting sportsmen.

Concerning claims 2-10 and 12-16, as it is indicated on page 8 of the Description, the game organizers first determine temporal, and/or speed, and/or coordinate, and/or precision characteristics of a game element 1, every space vehicle, relative to at least one game event assessment means 3, a man-made or natural space object, and then compare the above characteristics of all space vehicles. Thus, the said technical characteristics can be different to the moment of the game start.

Besides that, as it is shown in page 9 of the Description, competitors in the racing are game elements 1, space vehicles of similar type equipped with the following systems:

in-orbit stabilization and maneuvering systems,  
independent rendezvous systems to approach space objects,  
for instance, the game event assessment means 3, such as a satellite,

measurement systems for measuring parameters of a relative movement with the means 3, a space object or a target (for instance, a satellite to approach),

and other systems, such as:  
a system for capturing and hauling the means 3, a satellite (or another space object), or

a system for packaging a satellite into a reliable envelope to protect it against damage in the space flight, or another package to reduce pollution of cosmic space from its use.  
Therefore, a game conducted in accordance with the invention ensures clearing cosmic space of waste.

The systems mentioned above can also be different for different space vehicles.

The number of space vehicles for races is to be not less than two like in ordinary races.

Technical characteristics of space vehicles as well as technical characteristics of, for example, racing automobiles have direct influence on reaching finish, i.e. being the first to reach the game event assessment means.

The term "technogenic" means "made by a human", the term "technogenic object" means "an artificially made object". Thus, the space vehicles and space waste are the techogenic artificially made objects, and planets and meteorites are the natural objects. The term is well known in connection with aeronautics and space. For example, an abstract from a Nasa website (<http://ltpwww.gsfc.nasa.gov/ISSSR-95/technolo.htm>) is attached, using the term "technogenic". A search from the Google.com search engine produces many instances of the term. A printout is attached showing just a few of the sites located through Google.com using "technogenic".

As is indicated in the page 7 of the Description, when bets are accepted from the game participants, the space vehicles may be located on the Earth and prepared to be launched, or already placed in orbit. Every space vehicle may have an orbit of its own, like tracks for sprinting sportsmen. Thus, the start point can be located both on the Earth and in the cosmic space. The finish point - either directly the game event assessment means, or maximum approach to this means, or the space vehicle passing of the said means in the closest distance comparably with the other space vehicles. The purpose of the game event assessment means is the same to one that a finish has, namely, to determine who is the first, the second, the third and so on of the competitors. It is the race's aim - its reference point. As it is indicated in pages 13-14 of the Description the game event assessment means 3 can be a part of a surface on a space vehicle (SV) or its entire surface, or its anti-meteorite shield.

It may be also a surface of a specially designed SV for conducting the game. The game event assessment means 3 may be a natural space object, for instance, a part of a surface of a planet or, for instance, the Moon.

General game field can be the SV surface consisting of different conventional and outlined zones, on which the drawing results are fixed. Dimensions of the common surface and the game fields are selected prior to the beginning of the game on the basis of the game rules and characteristics of occasional process sources (for instance, a density of a space waste stream, meteorite particles, etc.).

A space vehicle (SV) is provided with facility 2 which may be a panel with hit detection instruments, such as, for instance, particle detectors to sense the facts of interaction between the panel and particles moving at appropriate relative speeds. The particle detectors have a threshold response level so that to eliminate responses to hits by particles separated from the SV per se, for instance, when placing it into orbit.

The facility 2 with a system for registering an occasional game event result may be any device which provides registering a fact of interaction between a game element 1 and the SV surface. For instance, the use may be made of the panel with space particle detectors employed in the project of "Vega" interplanetary SV in flight to Halley's Comet, or a meteorite particle detector mounted on USA satellites "Pegas 1, 2, 3", LDEF, the data obtained being transmitted to the Earth. (See, for example, "Watts, A.J., Atkinson, D.R. and Rieco, S.F., Dayton,



OH.") Constructing of such surfaces of the game event assessment means 3 can be realized without technical difficulties, on the base of panels, designed for space power stations.

As the cosmic particles do randomly move, the shadowing of some parts of the space vehicle's surface by construction elements from any side has no influence on the drawing results because from the other sides the panels with the game fields are not shadowed. Besides that, as it is indicated in page 14 of the Description, dimensions of the common surface and the game fields are selected prior to the beginning of the game on the basis of the game rules and characteristics of occasional process sources (for instance, a density of a space waste stream, meteorite particles, etc.).

The detectors (SP) per se may be instruments used in the international Venus-Halley project («Foton», «Dusma», SP-2). To provide a start pulse required to register an SP by the instruments, physical mechanisms of inducing a charge and current in a film capacitor, film layer breakdown burst are employed. The acoustic and electric effects in piezotransducer at film layer breakdown are described in, for example, "McDonnel, J.A.M. et al. (1984) An Empirical Penetration Equation for Thin Metallic Films Used in Capture Cell Techniques". Nature, 309, pp. 237-240. Making the SP registration instruments in the form film capacitors ensures almost instantaneous detection of particles which break down a film of any dimension. Employed in this case is the principle of capacitor discharge through the plasma which is generated as the result of evaporation of a film and SP

material at the film breakdown and fast dissipates in the cosmic space environment. As luminosity (integral impact energy), temperature and spectral characteristics of the plasma are being changed, the participle characteristics can be, in principle, quickly analyzed. Moreover, the acoustic pulse energy provides the possibility to determine the kinetic energy of particles. Thus, SP paths can be defined by locations of breakdown points. Therefore, several independent measurement systems can be used to monitor a game event occurrence, including displaying both the processes occurring when the particles hit the detector, and impact traces.

With regard to item 7 of the Office Action, wherein the Examiner objects to the phrase "such as", applicants have amended claim 11 with attention to the Examiner's concerns. Claim 11 now recites "wherein said movable objects are space waste".

Thus, the applied technical decision can be realized using facilities, already known from the art. To confirm the aforesaid below there are set the references on the sources of information concerning the question raised by the examiner, known to the applicants:

1. Number of fragments and outworked space objects enough for realizing the game (see, for example, report of A.I.Nazarenko, N.P.Morozov "Questions of the International cooperation concerning the problem of technogenic space waste", X International symposium on the history of aviation and astronautics, Moscow, June 1995, Institute of natural and techniques history RSA).

2. Natural and artificially made space bodies or "space waste" (small space objects, meteoroid particles, etc.) located in the cosmic space in amount enough for realizing the game (Astronautics, encyclopedia, Soviet Encyclopedia, Moscow 1985, pages 189, 240, 245-246).

3. Meteorite particle detector mounted on USA satellites "Pegas 1, 2, 3", LDEF (Astronautics, encyclopedia, Soviet Encyclopedia, Moscow 1985, pages 289, 512)

4. Constructing of the game event assessment means for assessing a spatial position of the game elements on its surface divided into game fields can be realized on the base of panels, designed for space power stations, see, for example, chapter "Plant in the Sky, Power Station in the Sky" I the book "The Illustrated Encyclopedia of Space Technology A comprehensive history of space exploration", Kenneth Gatland Consultant and Principal Author, Salamander book, Published By Salamander Book Limited, London, 1982.

5. In the catalogues of the Centers of Cosmic Space Control of Russia and the USA there accounted over 8500 objects. As a rule, they are the objects with the size over 20 cm. Altogether there are about 80,000,000 SPs of 1 mm in diameter, about 10,000,000,000 SPs of 0.1 mm in diameter, and about 100,000,000,000,000 SPs of 0.0001 mm in diameter, the smallest to damage detectors of the contemporary space vehicles, in orbits of artificial satellites from the atmosphere boundary (~120 km) to the height of 1600 km. (see, for example, Andrew E. Potter,

Measuring the Orbital Debris Population, Earth Space Review, Gordon and Breach, Amsterdam B.V. Vol.4, No.3, 1995, p.21-29)

6. The number of such "waste particles" is ever growing about twice every 20 years, this placing in danger the future space flights (see, for example, A.I.Nazarenko, Prediction and Analysis of Orbital Debris Environment Evolution, Proceeding of the First European Conference on Space Debris, Darmstadt, Germany, 5-7 April 1993, ESA SD-01, p 293-297).

7. The USA cylinder-shaped LDEF satellite of 10 m in size and 3 m in diameter during 69 months, from April 1984 to January 1990, has got 32000 breakdowns, this giving 185,000 hits a year per the discussed rated area of 1000 m<sup>2</sup>. Thus, a conventional SV surface is quite sufficient to conduct the game. (See Interagency Report on Orbital Debris, Executive Office of the President of the United States, November 1995, Library of Congress Catalog Card Number: 95-72164, The White House, Washington, USA).

8. Natural occasional process of formation and moving of the "space waste" - small cosmic objects of natural and artificially made objects is described in details in the known source of information (see, for example, the article of William J.Broad "San Jose Mercury News", 26 February 1995, (n.9, 10, 11,12)).

9. The book "Collisions in the Circumterraneous Space (space waste)" under edition of A.G.Masevich, Moscow, Kosmosinform. 1995, 322c.

10. Proceeding of the International Workshop on Techniques for Cooperative International Satellite Orbit Determination and

Maintenance, Moscow October 14-15, 1993, Published by Russian Academy of Sciences, Kaman Sciences Corporation Alexandria, Virginia for the Naval Space Command USA, Edited by A Nazarenko, CPS RAS, L.Nagl, , Kaman Sciences Corporation, S.Knowles, Naval Space Command, pp 45-60.

11. According to data of "Report Goddard Space Flight Center, dated September, 1997" number of satellites launched to the orbit is 24972.

12. The YES satellite: a tethered momentum transfer in the GTO orbit By Michiel Kruijff Delta-Utec Kamperfoeliestraat 63, 2563 KC Den Haag Delta-Utec@Delta-Utec.demon.nl Erik Jan van der Heide Delta-Utec, 1997.

13. Carroll, J., SEDS deployer design and flight performance, AIAA-93-4764

14. Beletski, V.V., Levin, E.M., Dynamics of Space Tether Systems, 1993

15. Proceedings of the international round table on tethers in space, Noordwijk, 1994 (About capturing and transporting freight using rope systems)

Web pages:

16. [www.delta-utec.demon.nl](http://www.delta-utec.demon.nl): YES satellite (About rope systems).

17. <http://hyperspace.nrl.navy.mil/atex.html> ATEEx (About rope systems).

18. <http://hyperspace.nrl.navy.mil/TiPS> TiPS (About rope systems).

19. [www.tethers.com](http://www.tethers.com) Tether links (About capturing and transporting freight using rope systems).

20. [www.infinity.msfc.nasa.gov/Public/ps01/spropulsion.html](http://www.infinity.msfc.nasa.gov/Public/ps01/spropulsion.html)  
NASA MSFS Image Title: Saturn Missions and Configurations Chart  
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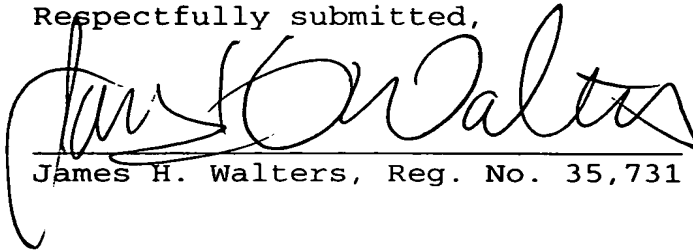
In the applicant's opinion, in the present response there are set the explanations and definitions fully responding to the Examiner's questions and concerns. It is respectfully submitted that the above noted amendments and remarks and explanations are enough to resolve the examiner's objections. Accordingly, the applicants hope that all obstacles for further considering of the application and issuing the patent will be resolved with receiving of this response.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless applicants have argued herein that such amendment was made to distinguish over a particular reference or combination of references.

In light of the above noted amendments and remarks, this application is believed in condition for allowance and notice

thereof is respectfully solicited. The Examiner is urged to contact applicants'/applicant's attorney at 503-224-0115 if there are any questions.

Respectfully submitted,

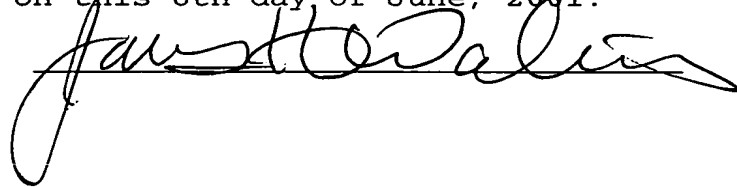


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In the Specification:

Page 7, lines 5-7

Fig. 2 illustrates how a method and devices in accordance with the invention can be implemented using accidental hitting game fields on a surface of a space vehicle by movable objects[.];

In the Claims:

2. (Amended) The method according to claim 1 wherein said game elements are space vehicles [having various technical characteristics].

4. (Amended) The method according to claim 3 wherein said game event assessment means is a [technogenic object relating to] space waste, said [technogenic object] space waste being captured on reaching its position.

11. (Amended) The method according to claim 9 wherein said movable objects are [particles of technogenic origin, such as] space waste.

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**TECHNOLOGY OF ECOLOGICAL INVESTIGATION OF AREAS  
SUBJECTED TO TECHNOGENIC IMPACT USING  
REMOTE SENSING FACILITIES**

**Alexander A. Kovalyov**

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Technology for complex radiation and ecological investigation of areas subjected to intense technogenic impact including sites of the former military objects using methods and technical facilities of remote sensing, mobile and stationary radiation of ecological laboratories, sample collection and geodesic instruments is described. Investigation results are presented.

Ecological investigation is conducted in several phases: preliminary investigation, detailed investigation, development of recommendations for remediation.

Preliminary investigation includes archive data retrieval, analysis of multitemporal images, population polling, registration of detected contaminations, site and building inspection, assessment of geological and hydrogeological conditions, chemical and radiological analysis of selected samples of soil, water, vegetation, soil gases and ground water with exact geodesic site fixing, aerial photography, stereophotogrammetric image processing, thematic multispectral aerial photography in visible, infrared and microwave ranges of spectrum for detection and localization of contaminated sites.

Detailed investigation includes geological, hydrogeological and sanitary-hygiene site investigation, development of optimum network for sample collection, chemical and radiological analysis, delineation of contaminated areas by geodesic instruments, creation of geoinformation system, general assessment of the site ecological state.

In the last phase recommendations for further use of the site and proposals on remediation are generated.

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